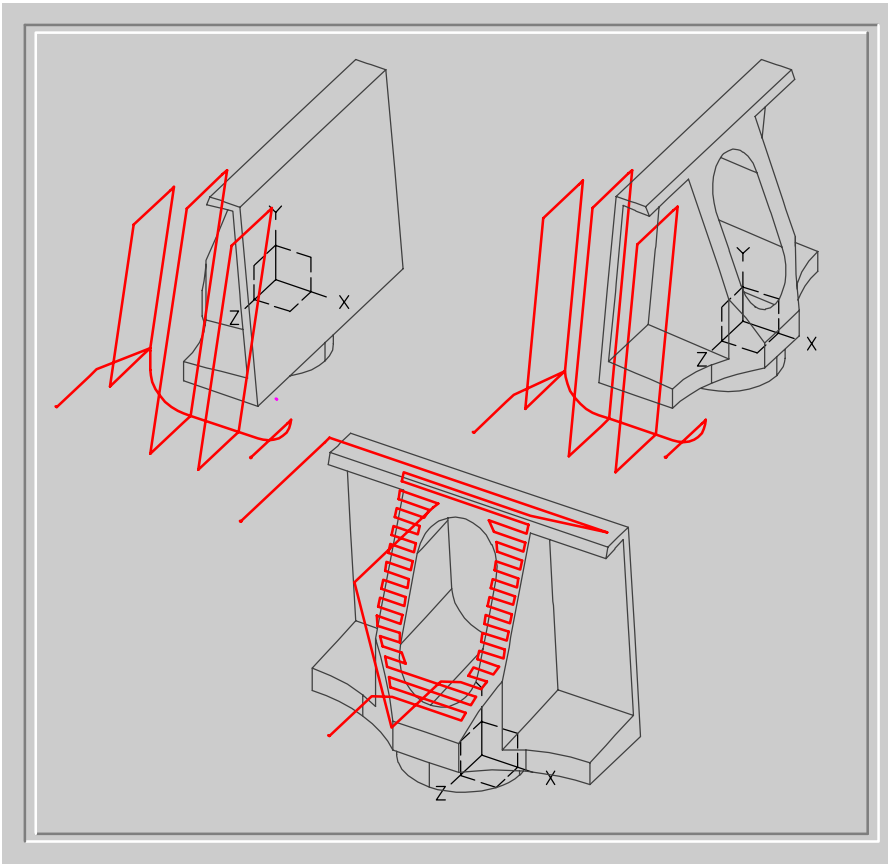


Using Multiple Setups

I-DEAS® Tutorials: Milling Projects and Turning Projects

In this tutorial, you'll machine the bracket shown above. using a 3-axis machine. Because the machine can't rotate about the 4th and 5th axes, you can't reach all the surfaces in one setup. You'll create multiple setups and reposition the workpiece so the surfaces to be machined are aligned with the positive Z axis, or the cutting direction of the tool.

Learn how to:

- orient the part to the default MCS
- create new setups

Before you begin...

Prerequisite tutorials:

- all tutorials under the Modeling Fundamentals menu
- Introduction to Generative Machining
- Building a Setup Assembly
- Generating In-process Stock and Checking Validity
- Working with Tools and Tool Catalogs
- Picking Holes
- Setting Machining Parameters for Hole-making Operations

The file you need for this tutorial is distributed with the product. You must copy it into your local directory.

Move to the local directory where you want to copy the file. Then:

In UNIX:

```
cp $SDRC_INSTL/examples/nc/
tut_multiple_setup.arc .
```

In Windows:

```
copy %SDRC_INSTL%\examples\nc\
tut_multiple_setup.arc .
```

If you can’t copy the file, you may have to set up the variable needed to copy from the I–DEAS installation.

```
. sdrc_oadev
```

If you can’t access the file, contact your system administrator. The file may not be installed.

If you didn't start I-DEAS with a new (empty) model file, open a new one and give it a unique name.

File
Open

Open Model File form

Model File name: any unique name
OK

Make sure you're in the following application and task:

Application: Manufacturing
Task: Generative Machining

Set your units to inches.

Options
Units

Inch (pound f)

Import the archive file that contains the parts and tools that you need to complete this tutorial. Importing an archive file can take several minutes. Be patient.

File
Import

Import Selections form


I–DEAS Archive File

OK

File Name Input form

Archive file name:
tut_multiple_setup.arc

OK

The Manufacturing application quits, an informational message is displayed (the message will dismiss automatically), and the archive file is imported.

Import Archive File Status

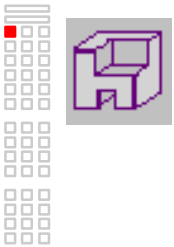

Check *I-DEAS List*.

Be sure to check the List region to be sure that the parts imported properly.

Dismiss

A second informational message is displayed (the message will dismiss automatically) and the Manufacturing application starts.

Create a job.

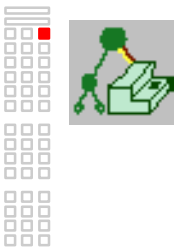


NC Job Create form

Job Name: Setup Machine Bracket

OK

Add the part to the job.



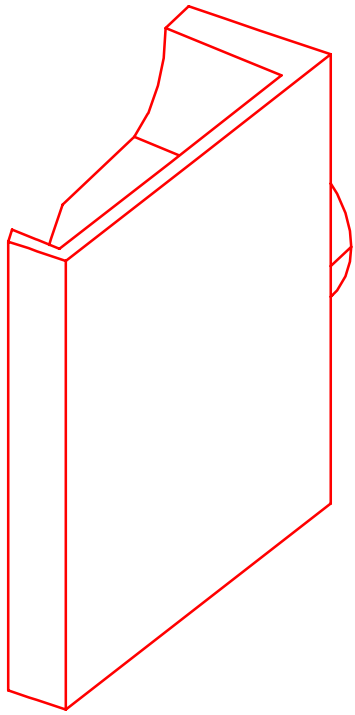
Get

From Bin/Library

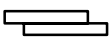
Select Part/Assembly form

tut_bracket

OK



Recovery Point



File
Save

Warning!
If you're prompted by I-DEAS to save your model file, respond:

No

Save only when the tutorial instructions tell you to—not when I-DEAS prompts for a save.

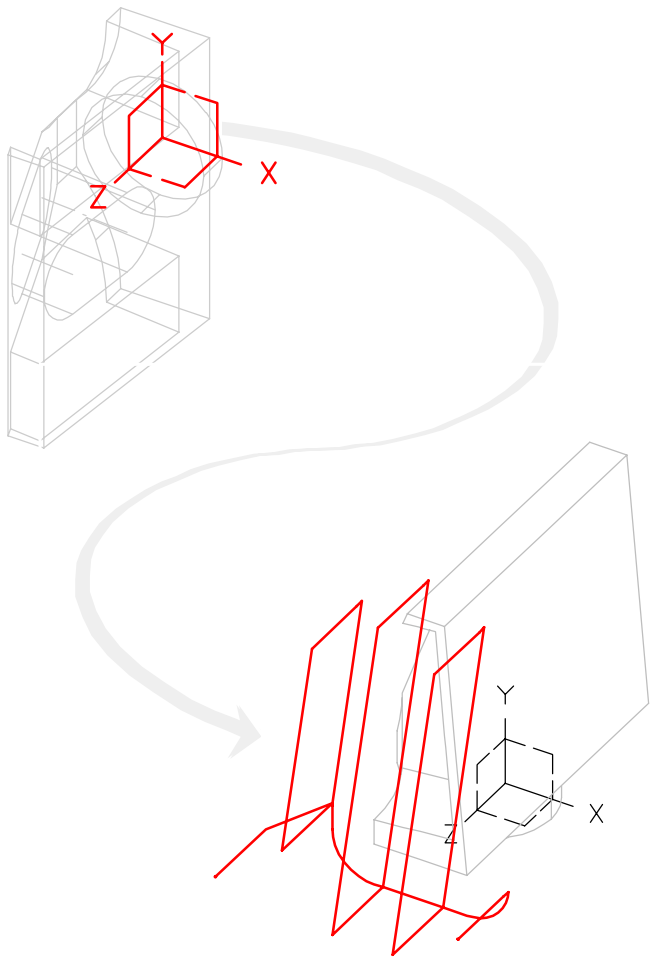
If you make a mistake at any time between saves and cannot recover, reopen your model file to the last save and start over from that point.

Hint
To reopen your model file to the previous save, press Control-Z.

Orient the part to the default MCS 1 of 10

In the next steps, you'll align the surface to be machined in relation to the Z axis of the global-space coordinate system. The global-space coordinate system is the default origin and orientation of the machine tool without a 4th or 5th axis. You can use it to represent a 2-, 2 1/2-, or 3-axis machine tool.

You'll then create a volume clear operation and generate a toolpath.

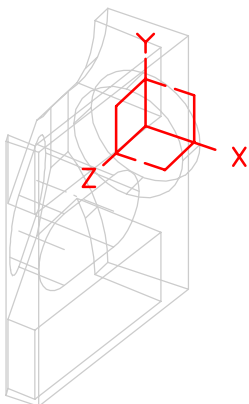


What: Display the global-space coordinate system. The part is located at the global-space coordinate system, which acts as the default origin.

How:

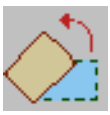
Workplane Attributes form

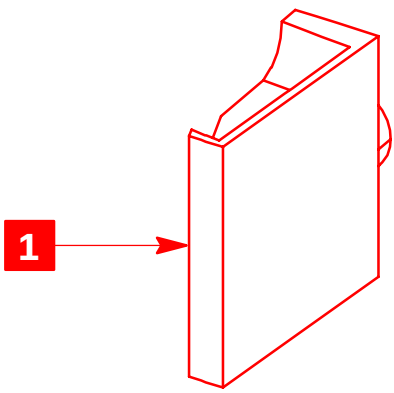
- *Display Origin*—On
- *OK*



What: Rotate the part about the X axis so the surface to be machined aligns with the Z axis. The Z axis represents the axis of rotation for the tool spindle.

How:



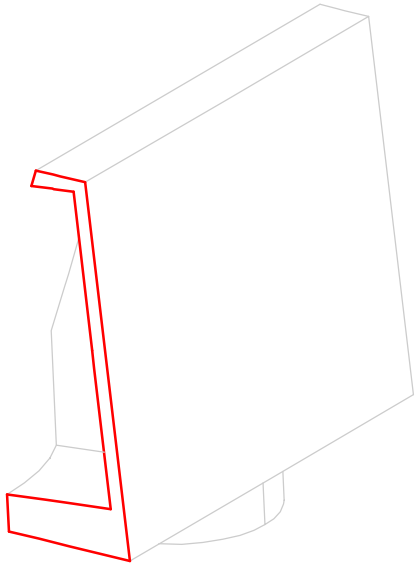


 (twice)

 ***Check I-DEAS Prompt***.

Enter rotation angles: –90, 0, 0

Result



Things to notice

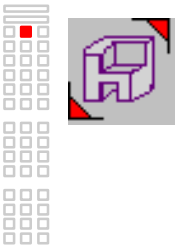
The side of the part is aligned with the Z axis.

Recovery Point

File
Save

What: Create a volume clear operation.

How:



NC Job Planning form


OpGroup–1

OpGroup Specification form

Operation Selection form


Category: *Milling*


Type: *Volume Clear*


Create

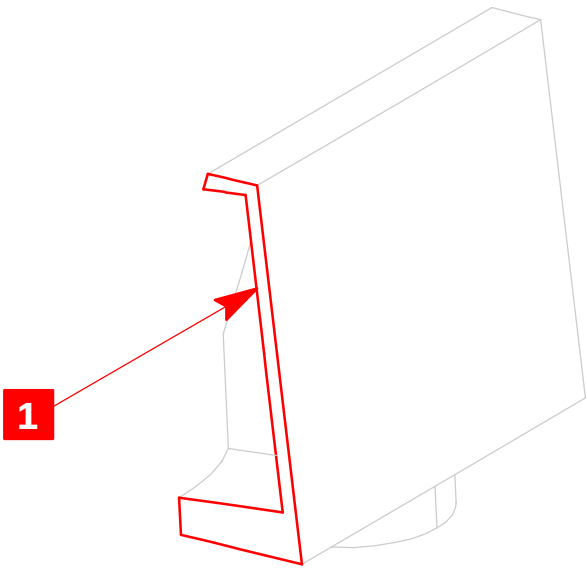

Don’t close the Operation Specification form.

What: Name the operation and pick the surface to be machined.

How:

Operation Specification form

Name: Mill Face A



Continue on the next page to define the stock.

What: Define the stock as a footprint. To learn more about defining stock for volume clear operations, complete the Creating Face Mill and Volume Clear Operations tutorial.

How:

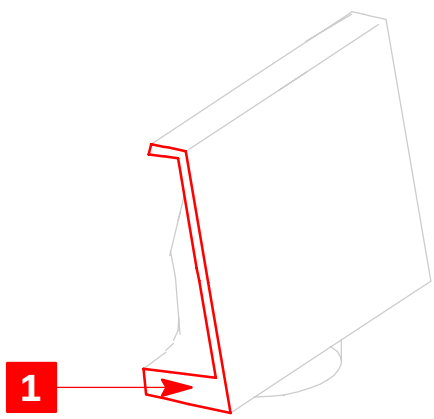
Stock Specification form

System Defined Stock: On

Set Stock Area To: Convex Foot Print

With XY Offset of: 0.5

Stock Top



Check *I-DEAS Prompt*.

Accept the surface, if necessary.

Stock Top: 1.9

The top of the part is located at 1.81102. You enter 1.9 to specify material to machine above this surface.

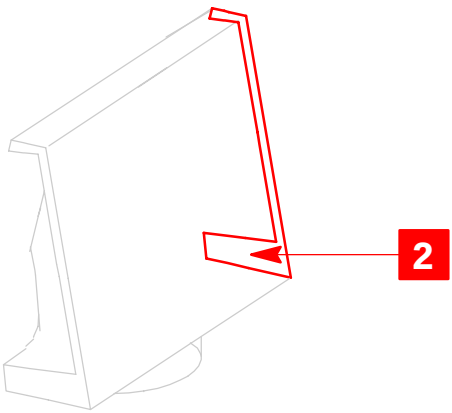
Don’t close the Stock Specification form.

What: Define the bottom of the stock.

How:

Stock Specification form

Stock Bottom



Accept the surface, if necessary.

OK

Don’t close the Operation Specification form.

What: Use a 2” diameter end mill to machine the surface.

How:

Operation Specification form

Cutting Tool Specification – Mill form

Find...

Item Selection form

2” dia end mill

OK

Cutting Tool Specification—Mill form

OK

Don’t close the Operation Specification form.

What: Specify the cut pattern as *Zig Zag with Stepover out of Workpiece*. Then set the cutting passes as .5” beyond the boundary of the stock. This ensures that material is removed from the edges of the part.

Set the *Default Finish Allowance* to zero so no material is left on the surface.

How:

Operation Specification form

Machining Parameters—Cut form

 *Cut Pattern*

 *Cut...*

Allowances and Tolerances...

 *Default Finish:* 0

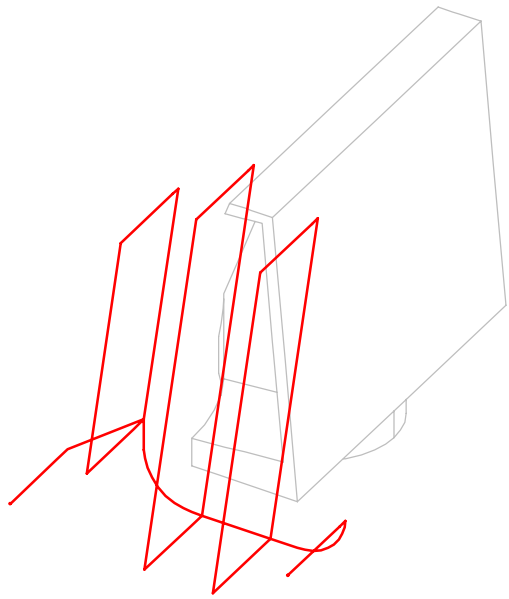
 *OK*

Don’t close the Operation Specification form.

What: Generate the toolpath.

How:

Operation Specification form



Things to notice

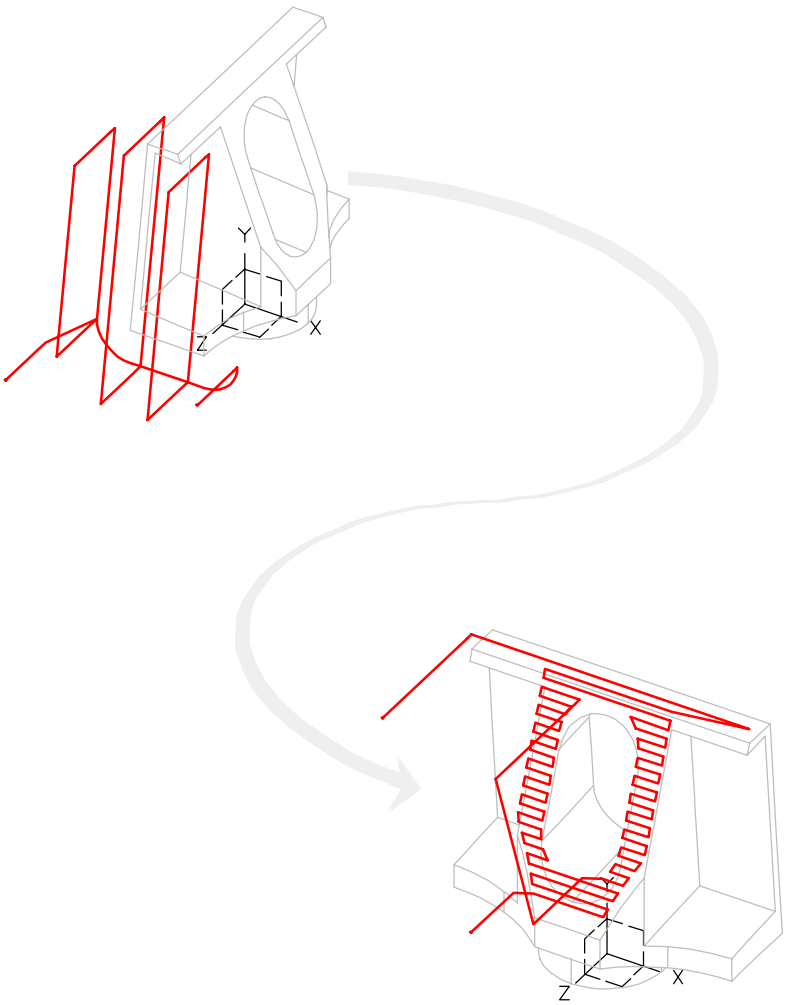
The toolpath extends past the edge of the part by .5”. Also, the tool follows a zig-zag cut pattern. It doesn’t stay in contact with the part throughout the entire toolpath because you accepted the default cut type of *Climb.*

Recovery Point

File
Save

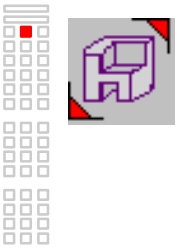
In the next steps, you'll create two setups. For each setup, you'll rotate the part to align the surface to be machined with the Z axis of the global-space coordinate system. You'll then create an operation to machine the surface.

In general, if you must modify a setup assembly, such as moving the part or changing a clamp, for a new machining operation, you should create a new setup. Changes to the parts in a setup assembly invalidate any operations in the current setup. When you create a setup, the software copies the setup assembly from the previous setup so you can modify it.



What: Create a setup.

How:



NC Job Planning form

Deselect *Mill Face A* by pressing the Control key and selecting *Mill Face A*.

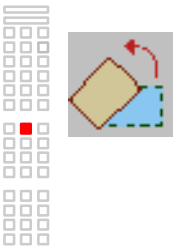
Setup Specification form

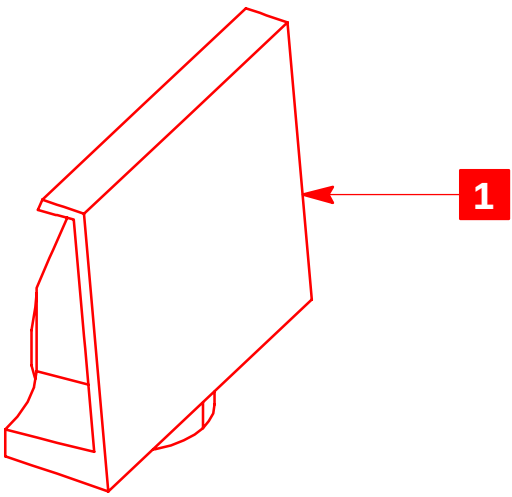
Dismiss

Dismiss

What: Rotate the part 180 degrees about the Y axis to machine the other side of the part.

How:



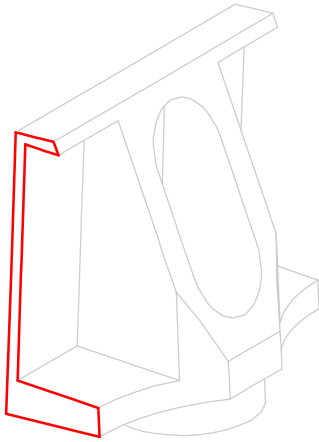


(twice)

Check *I-DEAS Prompt*.

Enter rotation angles: 0, 180, 0

Result



Things to notice

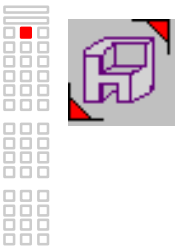
The side of the part is aligned with the Z axis.

Recovery Point

File
Save

What: Modify OpGroup−2 and create a volume clear operation.

How:



NC Job Planning form

Opgroup−2

OpGroup Specification form

Operation Selection form

Category: *Milling*

Type: *Volume Clear*

Create

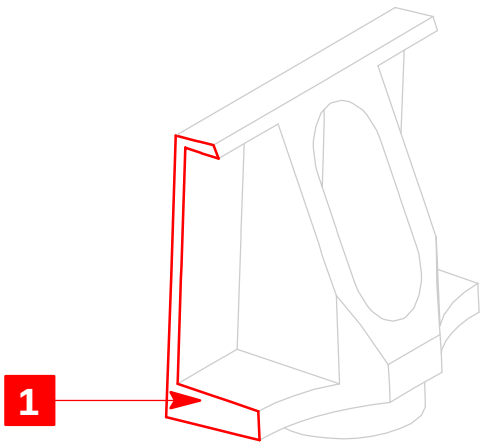
Don’t close the Operation Specification form.

What: Name the operation and select the surface to be machined.

How:

Operation Specification form

Name: Mill Face B



Stock Specification form

OK

Don’t close the Operation Specification form.

What: Get a 2” diameter end mill from the tool catalog.

How:

Operation Specification form

Cutting Tool Specification – Mill form

Find...

Item Selection form

2” dia end mill

OK

Cutting Tool Specification—Mill form

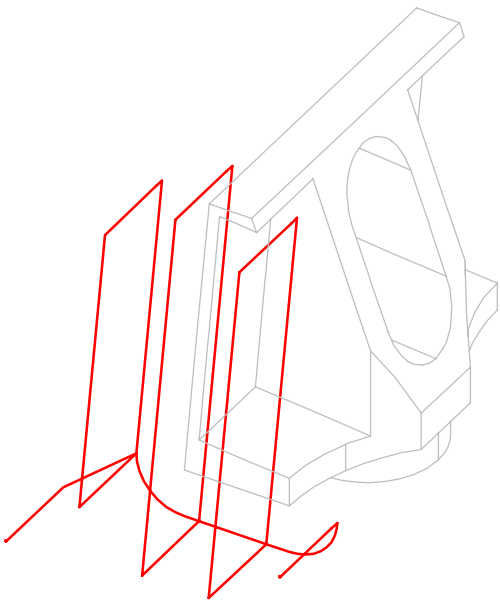
OK

Don’t close the Operation Specification form.

What: Generate a toolpath.

How:

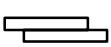
Operation Specification form



Things to notice

The machining parameters from the previous operation are applied to this operation.

Recovery Point



File
Save

What: Create a final setup.

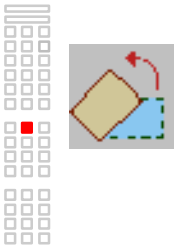
How:

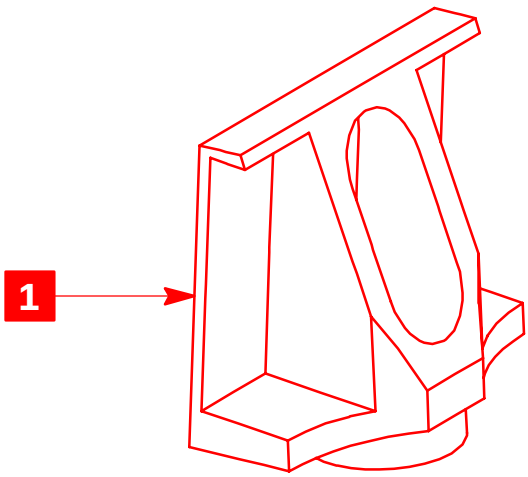
Setup Specification form

 *Dismiss*

What: Rotate the part −90 degrees about the Y axis.

How:



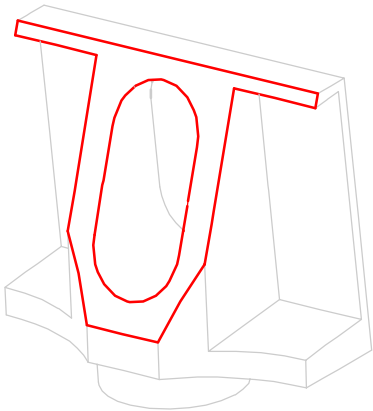


(twice)

Check *I-DEAS Prompt*.

Enter rotation angles: 0, −90, 0

Result

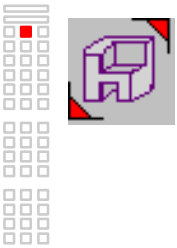


Things to notice

The front of the part is aligned with the Z axis.

What: Create a copy mill operation.

How:



NC Job Planning form

 Opgroup–3

OpGroup Specification form

Operation Selection form

 *Category*: *Milling*

 *Type*: *Copy Mill*

 *Create*

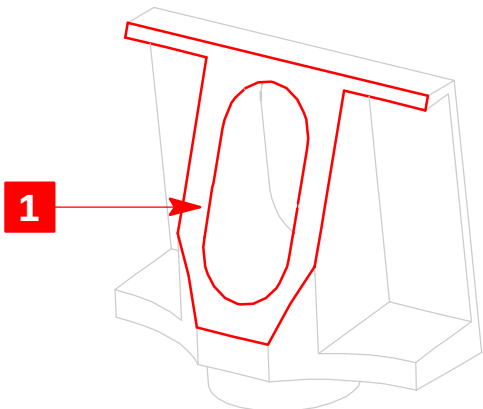
 Don’t close the Operation Specification form.

What: Name the operation and select the surface to be machined.

How:

Operation Specification form

Name: Mill Face C



Surface Selection form

Dismiss

Don’t close the Operation Specification form.

What: Get a 1/2” diameter end mill for the operation.

How:

Operation Specification form

Cutting Tool Specification – Mill form

 *Find...*

Item Selection form

 1/2” dia end mill

 *OK*

 *OK*

 Don’t close the Operation Specification form.

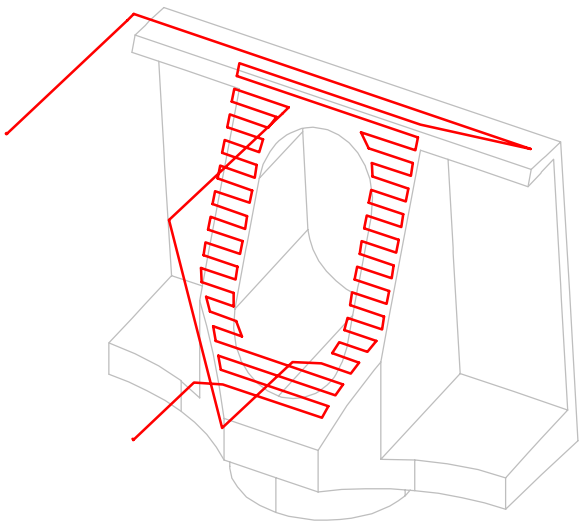
What: Create the toolpath.

How:

Operation Specification form

I-DEAS Warning

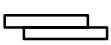
 *Dismiss*



Things to notice

For this toolpath, the tool retracts only after the side of the hole has been machined. It then makes one rapid move and engages on the other side.

Recovery Point

 *File*
Save

Tutorial wrap-up

You’ve completed the Using Multiple Setups tutorial.